

CHAPTER 8

Miscellaneous

Wisconsin's Homegrown, Renewable Fuels

Energy Fuels. What is Wisconsin's most plentiful renewable energy resource? You may be surprised to learn that more than 60 percent of Wisconsin's renewable energy—replacing fossil fuels—is biomass. Sustainability harvested wood, wood residue from manufacturing and papermaking, agricultural residue, grasses and other energy crops all fall under the heading: biomass.



Coal is popular fuel for electricity generation because it has a high energy content, is inexpensive and creates baseload power—meaning the electricity generation is continuous. As a result, it can be hard to displace coal with renewable energy that is often intermittent, hard to store to meet baseload requirements, and has a high capital cost. But, biomass is different.



Biomass can be burned to meet baseload requirements, results in little net production of carbon dioxide, and is relatively inexpensive, especially considering that it's harvested in the state. All in all, it's a renewable resource with the potential to displace coal.

Biomass is benefiting from new thinking in Wisconsin, including: repurposing old coal plants to burn biomass; a Bayfield County study looking at the feasibility of growing woody biomass crops from fast-growing tree hybrids; and, a biomass aggregation study in western Wisconsin for sustainable harvest. This multifaceted approach to biomass is another step on the road to achieving significant changes in renewable energy generation in Wisconsin.

Transportation Fuels. Ethanol is Wisconsin the most prevalent renewable transportation fuel.

Wisconsin ranks ninth in the country for ethanol production, generating more than 500 million gallons of fuel, of which 53 percent was used in the state in 2008. Nearly all of Wisconsin's gasoline is blended up to 10 percent with ethanol—more commonly known as E10. E85 is gradually becoming both a more common and accessible fuel in Wisconsin. In 2007 and 2008, an additional 17 E85 stations became operational across central and Eastern Wisconsin, boosting the total number of E85 stations to 135 throughout the state. Those 17 E85 stations alone have displaced nearly three million gallons of petroleum fuel with ethanol.



Small-Scale Biodiesel. Biodiesel, made from soybeans, is gradually becoming a more familiar fuel source in Wisconsin. Over the past several years, the Wisconsin Office of Energy Independence has promoted production of biodiesel on a small scale through the Wisconsin Small-Scale Biofuel Producers Program. The program is offered free of charge to current and prospective small scale biodiesel (and ethanol) producers. The program has involved a number of Wisconsin's technical colleges, as well as the UW System, UW Extensions and local high schools. With 30 current producers registered under this program, the number of smaller-scale biodiesel producers is expected to increase throughout 2010.

United States Energy Use and Gross Domestic Product

ENERGY USE
PER DOLLAR
OF GDP
43.7%
SINCE 1980

Until the early 1970s, energy use kept pace with the growth in the nation's economy. Economic growth during the 1970s and early 1980s was accompanied by slower growth in energy use due to increases in efficiency and a shift away from energy intensive industries.

Efficiency, in terms of decreasing energy required to produce a dollar of Gross Domestic Product, continues to increase slowly.

The ratio between electric sales and Gross Domestic Product has fallen about 21.3 percent since 1980. Energy use per dollar of Gross Domestic Product declined 43.7 percent since 1980.

1970-2008

Year	Resident Population (Thousands) ^{a,r}	Gross Domestic Product (Bil. of 2000\$)	Resource Energy Consumption (Quad. Btu) ^c	Electric Sales to Ultimate Customers (Bil. of kWh)	Resource Energy Per GDP (Thous. Btu/2000\$)	Electric Sales Per GDP (kWh/2000\$)
1970	205,052	3,771.9	68.00	1,391.4	18.03	0.3689
1975	215,973	4,311.2	72.00	1,747.1 ^d	16.70	0.4052
1980	227,225	5,161.7	78.12	2,094.4	15.13	0.4058
1985	237,924	6,053.7	76.49	2,324.0	12.64	0.3839
1990 ^r	249,623	7,112.5	84.65	2,712.6	11.90	0.3814
1995 ^r	266,278	8,031.7	91.17	3,013.3	11.35	0.3752
1996 ^r	269,394	8,328.9	94.18	3,101.1	11.31	0.3723
1997 ^r	272,647	8,703.5	94.77	3,145.6	10.89	0.3614
1998 ^r	275,854	9,066.9	95.18	3,264.2	10.50	0.3600
1999 ^r	279,040	9,470.3	96.82	3,312.1	10.22	0.3497
2000 ^r	282,172	9,817.0	98.98	3,421.4	10.08	0.3485
2001 ^r	285,040	9,890.7	96.33	3,394.5	9.74	0.3432
2002 ^r	287,727	10,048.8	97.86	3,465.5	9.74	0.3449
2003 ^r	290,211	10,301.0	98.21	3,493.7	9.53	0.3392
2004 ^r	292,892	10,675.8	100.35	3,547.5	9.40	0.3323
2005 ^r	295,561	10,989.5	100.49	3,661.0	9.14	0.3331
2006 ^r	298,363	11,294.8	99.88	3,670.0	8.84	0.3249
2007 ^r	301,290	11,523.9	101.55	3,765.0	8.81	0.3267
2008 ^p	304,060	11,652.0	99.28	3,722.0	8.52	0.3194

^a As of July 1.

^c Quadrillions of Btu.

^d Beginning in 1975, the DOE data source has been used.

^p Preliminary estimates.

^r Revised.

Source: U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review* (June 2009), <http://www.eia.doe.gov/mer/>; Tables 1.3 and 7.1; Wisconsin Department of Administration Demographic Services resident, national population estimates as of July 1.

Wisconsin Population, Households, Gross State Product and Personal Income

1970-2008

Year	GDP Deflator	Population ^a (Thousands)	No. of Households ^{a,r} (Thousands)	Gross State Product (Million 2008 Dollars)	Personal Income ^e (Current Dollars)			Personal Income ^e (2008 Dollars)		
					Total (Million Dollars)	Dollars Per Capita	Dollars Per Household	Total (Million Dollars)	Dollars Per Capita	Dollars Per Household
1970	27.53	4,417.8	1,328.8	90,181	17,609	3,986	13,252	78,297	17,725	58,928
1975	38.00	4,565.8	1,486.8	101,428	27,810	6,091	18,705	89,592	19,622	60,258
1980	54.04	4,705.6	1,652.3	120,972	47,623	10,120	28,823	107,881	22,927	65,294
1985	69.71	4,744.7	1,720.4	131,020	65,709	13,849	38,195	115,389	24,321	67,075
1990	81.59	4,891.8	1,822.1	150,513	88,635	18,119	48,644	132,992	27,186	72,987
1995	92.11	5,134.1	1,946.3	178,222	115,180	22,434	59,179	153,090	29,817	78,652
1996	93.85	5,182.0	1,971.6	184,908	121,718	23,489	61,736	158,770	30,639	80,530
1997	95.41	5,233.9	1,998.4	194,452	129,099	24,666	64,601	165,642	31,649	82,889
1998	96.47	5,280.0	2,024.5	203,903	138,667	26,263	68,494	175,967	33,327	86,919
1999	97.87	5,323.7	2,053.9	211,407	144,702	27,181	70,452	181,006	33,999	88,125
2000	100.00	5,376.0	2,092.5	215,137	153,548	28,562	73,380	187,976	34,965	89,832
2001	102.40	5,427.2	2,126.6	217,506	158,888	29,276	74,715	189,957	35,000	89,322
2002	104.19	5,472.3	2,157.1	221,599	163,309	29,843	75,708	191,890	35,064	88,954
2003	106.41	5,511.8	2,183.3	225,863	168,120	30,502	77,003	193,427	35,091	88,588
2004	109.46	5,556.9	2,212.1	232,406	174,655	31,430	78,955	195,335	35,152	88,303
2005	113.03	5,599.3	2,238.3	234,903	181,153	32,353	80,933	196,198	35,041	87,657
2006	116.68	5,632.9	2,257.1	238,965	191,895	34,067	85,018	201,343	35,743	89,201
2007 ^r	119.82	5,661.6	2,272.3	237,334	203,084	35,870	89,374	207,500	36,649	91,313
2008 ^p	122.42	5,688.7	2,288.0	240,000	209,999	36,915	91,783	209,999	36,915	91,783

HOUSEHOLD
INCOME
IN 2008 DOLLARS
1.3%
ANNUALLY
SINCE 1990

Wisconsin's population and number of households continue to grow. The number of households has grown faster than the population, as the number of persons per household has declined.

Household income growth, in constant 2008 dollars, has been about 1.3 percent annually over the 18-year period since 1990. Gross State Product in 2008 dollars increased by 1.1 percent.

Data in this table are provided as a reference point for making per capita comparisons. To explain recent increases in residential energy use, personal income per capita and per household are shown in current and constant 2008 dollars.

^a Household numbers for intercensal years estimated on basis of Public Service Commission of Wisconsin reports of electric utility residential customers. Starting in 2000, estimates are from the Department of Administration, Wisconsin Demographic Services Center.

^p Preliminary estimates.

^r Revised.

Source: U.S. Department of Commerce, Bureau of Census, *2000 Census of Population and Housing*, CPH-1-51 (August 2001) Final Official Population Estimates and Census Counts for Wisconsin Counties: 1970 – 2008; Department of Administration, Wisconsin Demographic Services Center; U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts, <http://www.bea.gov/bea/regional/>

Wisconsin Employment, by Type, 1970-2008

Employment trends indicate changes in economic activity in the commercial and industrial sectors.

**WISCONSIN
LABOR FORCE
0.7%**

In 2008, Wisconsin's working age labor force increased 0.7 percent.

**WISCONSIN
EMPLOYMENT
0.3%**

Employment in the state decreased 0.3 percent (10,260 jobs).

Employment in the goods producing sector decreased 2.7 percent compared to an increase of 0.1 percent in the services producing sector and a 0.5 percent decrease in the nonfarm sector. Most Wisconsin jobs are classified as services producing.

1970-2008 THOUSANDS

Year	Working Age 18-64	Total Employment ^a	Percent Working Age Employed	Total NonFarm ^{c,e,f}	Goods Producing ^{c,d}	Services Producing ^{c,e}
1970	2,362.6	1,530.5	(64.8%)		Data Not Available ^b	
1975	2,572.5	1,677.0	(65.2)		Data Not Available ^b	
1980	2,783.7	1,938.1	(69.6)		Data Not Available ^b	
1985	2,858.3	1,983.1	(69.4)		Data Not Available ^b	
1990	2,949.3	2,486.1	(84.3)	2291.5	614.8	1,676.7
1995	3,122.9	2,773.6	(88.8)	2558.6	672.5	1,886.1
1996	3,157.5	2,600.6	(82.4)	111.6	567.6	1,921.4
1997	3,194.8	2,655.8	(83.1)	115.7	579.2	1,960.9
1998	3,228.6	2,718.0	(84.2)	120.3	593.2	2,004.6
1999	3,261.0	2,784.0	(85.4)	125.7	594.8	2,063.5
2000	3,292.4	2,894.9	(87.9)	2833.8	723.0	2,110.8
2001	3,336.3	2,897.9	(86.9)	2813.9	689.5	2,124.3
2002	3,379.4	2,860.9	(84.7)	2782.4	656.2	2,126.1
2003	3,417.8	2,862.6	(83.8)	2143.4	631.9	2,143.4
2004	3,455.2	2,867.1	(83.0)	2807.1	633.3	2,173.8
2005 ^r	3,513.2	2,886.6	(82.2)	2842.1	636.4	2,205.7
2006 ^r	3,547.5	2,927.3	(82.5)	2866.4	637.2	2,229.3
2007 ^r	3,574.6	2,948.1	(82.5)	2884.4	630.9	2,253.5
2008 ^p	3,598.0	2,937.9	(81.7)	2870.2	614.0	2,256.2

^a Nonfarm wage and salary employment.

^b Industry employment data prior to 1990 are not available due to a change in coding from the Standard Industrial Classification (SIC) system to the North American Industrial Classification System (NAICS).

^c These data categories represent numbers of jobs, not numbers of individuals.

^d Goods Producing is a compilation of the Mining, Natural Resources, and Construction industries.

^e Services Producing is a compilation of all non-farm jobs that do not produce goods.

^f Total Non-Farm job is a compilation of many non-farm job categories, which includes Goods Producing and Services Producing.

^p Preliminary estimates.

^r Revised.

Source: Wisconsin Department of Administration, Demographic Services Center, *Final Population Projections for Wisconsin by Sex and Single Year of Age, 2000 – 2015* (January 2004) (2000-2007); *State Age-Sex Population Projections by Single Years, 2005 – 2020* (July 2009) (revised 2005 – 2007; 2008), www.doa.state.wi.us/subcategory.asp?linksubcatid=105&linkcatid=11&linkid=64&locid=9; Wisconsin Department of Workforce Development, unpublished employment data <http://worknet.wisconsin.gov/worknet/daces.aspx?menuselection=da>

Wisconsin Occupied Dwelling Units, by Type of Fuel for Space Heating

The number of households on this page for space heating and water heating may not match the number of households on page 135 due to differences in data sources. Data on page 135 are estimated households based on Wisconsin-specific estimates by the Department of Administration, Demographic Services Center.

1970, 1980, 1990, 2000, 2005 AND 2007 NUMBER OF UNITS AND PERCENT OF TOTAL

Fuel	1970		1980		1990		2000		2005 ^r		2007	
Natural Gas	654,851	49.3%	945,092	57.2%	1,111,733	61.0%	1,384,230	66.4%	1,453,768	65.5%	1,487,091	66.3%
Fuel Oil ^a	521,256	39.2%	425,622	25.8%	265,600	14.6%	158,499	7.6%	129,925	5.9%	107,386	4.8%
LP Gas	85,549	6.4%	130,476	7.9%	152,823	8.4%	228,408	11.0%	250,739	11.3%	248,441	11.1%
Electricity	24,763	1.9%	101,489	6.1%	168,615	9.3%	236,755	11.4%	288,829	13.0%	281,838	12.6%
Wood	6,795	0.5%	42,783	2.6%	107,239	5.9%	56,862	2.7%	72,452	3.3%	90,734	4.0%
Coal or Coke	29,708	2.2%	2,591	0.2%	787	0.04%	330	0.02%	583	0.03%	404	0.02%
Solar Energy	NA		NA		NA		NA		456	0.02%	252	0.01%
Other	5,334	0.4%	3,578	0.2%	11,294	0.6%	13,839	0.7%	16,850	0.8%	20,077	0.9%
None	548	0.04%	630	0.04%	4,027	0.2%	5,621	0.3%	5,969	0.3%	5,374	0.2%
Total	1,328,804		1,652,261		1,822,118		2,084,544		2,219,571		2,241,597	

^a Includes kerosene.

^r Revised.

Source: U.S. Department of Commerce, Bureau of the Census, *Census of Housing* (1970, 1980, 1990 and 2000) and American Community Survey (2005, 2007).

Wisconsin Occupied Dwelling Units, by Type of Fuel for Water Heating

1970, 1980, 1990, 2000, 2005 AND 2007 NUMBER OF UNITS AND PERCENT OF TOTAL

Fuel	1970		1980		1990 ^{c,r}		2000 ^{c,r}		2005 ^{c,r}		2007 ^{c,r}	
Natural Gas	668,219	50.3%	877,135	53.1%	1,036,118	56.9%	1,244,544	59.7%	1,374,571	61.9%	1,410,597	62.9%
Fuel Oil ^a	36,913	2.8%	36,048	2.2%	29,000	1.6%	21,000	1.0%	15,500	0.7%	9,000	0.4%
LP Gas	93,955	7.1%	125,741	7.6%	142,000	7.8%	138,000	6.6%	133,000	6.0%	124,000	5.5%
Electricity	491,803	37.0%	599,827	36.3%	603,000	33.1%	671,000	32.2%	687,500	31.0%	690,000	30.8%
Wood	864	0.1%	b		b		b		b			0.0%
Coal or Coke	3,612	0.3%	b		b		b		b			0.0%
Other	1,389	0.1%	4,755	0.3%	7,000	0.4%	6,000	0.3%	5,500	0.2%	5,000	0.2%
None	32,049	2.4%	8,755	0.5%	5,000	0.3%	4,000	0.2%	3,500	0.2%	3,000	0.1%
Total	1,328,804		1,652,261		1,822,118		2,084,544		2,219,571		2,241,597	

^a Includes kerosene.

^b Included with "Other".

^c Estimate by Wisconsin Office of Energy Independence.

^r Revised.

Source: U.S. Department of Commerce, Bureau of the Census, *Census of Housing* (1970, 1980, 1990 and 2000).

Wisconsin Motor Vehicle Registrations, by Type of Vehicle

TOTAL VEHICLE
REGISTRATIONS

1.2%

In 2008, total vehicle registrations decreased by 1.2 percent; auto registrations decreased by 1.5 percent. The truck category includes vans, sports utility vehicles and light trucks.

These data are provided as a factor to help compare the use of motor vehicle fuels across the years.

1970-2008

Year	Autos	Trucks	Buses	Motorcycles	Trailers	Total ^{a,b}
1970	1,762,681	317,096	8,178	53,642	64,065	2,210,492
1975	2,023,427	426,756	11,422	96,629	81,378	2,644,681
1980	2,248,951	665,012	13,375	169,329	93,288	3,215,302
1985	2,310,024	771,264	10,325	176,037	101,030	3,406,196
1990	2,456,175	1,053,280	14,518	149,281	152,712	3,825,966
1995	2,419,389	1,399,236	14,940	161,773	240,841	4,281,803
1996	2,398,351	1,464,366	15,413	136,794	205,177	4,260,959
1997	2,370,453	1,537,241	12,497	161,509	213,415	4,339,088
1998	2,402,019	1,668,241	17,061	151,391	231,934	4,513,250
1999	2,396,072	1,735,326	14,546	171,839	242,849	4,605,088
2000	2,405,408	1,822,078	15,587	160,927	256,890	4,703,294
2001	2,413,001	1,922,916	16,259	192,312	269,931	4,860,457
2002	2,404,081	2,012,847	17,061	183,890	285,471	4,948,282
2003	2,401,816	2,103,643	17,555	215,231	303,852	5,091,716
2004	2,387,459	2,176,903	14,099	207,592	334,898	5,170,728
2005	2,384,717	2,280,170	12,418	278,055	365,435	5,320,795
2006	2,427,905	2,354,954	13,222	266,195	396,374	5,458,650
2007	2,427,882	2,404,895	14,110	324,833	419,816	5,591,536
2008	2,391,300	2,400,680	10,736	307,808	411,871	5,522,395

^a As of June 30.

^b Total includes motor homes, mopeds and municipal vehicles; it does not equal sum of registration types shown before 2005. From 2005 on, motor homes, mopeds and municipal vehicles are included in trucks, motorcycles and autos, respectively.

Source: Wisconsin Department of Transportation (October 2009).

Wisconsin Division of Energy Services

Degree Day Zones



The energy needed to heat and cool homes and other buildings strongly depends on the outdoor temperature. The next few pages provide a set of tables listing typical and historic degree day figures throughout Wisconsin in eleven degree day zones—shown in the map on the left.

Heating and cooling degree days are relative measures of outdoor air temperature, and are defined as deviations of the mean daily temperature below or above a base temperature of 65 degrees Fahrenheit. Data for this section are collected through a partnership with the Wisconsin State Climatology Office.

Heating and cooling degree days are provided as population-weighted averages for the state, to provide a point of reference for comparing the severity of winters and summers to statewide energy use.

Source: Wisconsin Office of Energy Independence.

Wisconsin Normal Heating Degree Days, by Zone and Month

Heating degree days are relative measurements of outdoor air temperature and are defined as deviations of the mean daily temperature below a base temperature (65 degrees Fahrenheit, by convention). For example, a weather station recording a mean daily temperature of 40 degrees Fahrenheit would report 25 heating degree days. The normal heating degree days for each zone and month are the 30-year averages, from 1971 through 2000.

Month	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Zone 10	Zone 11	State ^a
January	1,715	1,688	1,612	1,678	1,654	1,537	1,647	1,635	1,568	1,490	1,384	1,507
February	1,374	1,371	1,321	1,317	1,329	1,270	1,301	1,311	1,233	1,209	1,132	1,223
March	1,182	1,176	1,120	1,088	1,107	1,065	1,064	1,086	997	978	949	1,016
April	768	725	682	621	637	638	601	629	576	576	611	616
May	412	367	334	286	316	301	263	301	263	261	318	300
June	138	128	106	83	79	85	58	71	51	63	86	79
July	48	50	35	27	18	19	16	20	13	12	13	17
August	71	83	60	53	57	38	31	50	42	33	18	33
September	267	283	246	218	232	208	197	208	171	183	134	180
October	614	640	590	555	572	540	551	535	501	504	443	505
November	1,044	1,057	991	1,018	1,012	925	997	986	937	892	808	900
December	1,517	1,512	1,431	1,508	1,480	1,350	1,470	1,450	1,378	1,298	1,200	1,323
Total	9,150	9,080	8,528	8,452	8,493	7,976	8,196	8,282	7,730	7,499	7,096	7,699

^a Population-weighted statewide average, based on 2000 census.

Source: National Oceanic and Atmospheric Administration, "Monthly Normals of Temperature, Precipitation, and Heating and Cooling Degree Days, 1971-2000 Wisconsin" *Climatology of the United States No. 81 (by State)*, (December 2000).

Wisconsin Normal Cooling Degree Days, by Zone and Month

Cooling degree days are relative measurements of outdoor air temperature and are defined as deviations of the mean daily temperature above a base temperature (65 degrees Fahrenheit, by convention). For example, a weather station recording a mean daily temperature of 90 degrees Fahrenheit would report 25 cooling degree days. The normal cooling degree days for each zone and month are the 30-year averages, from 1971 through 2000.

Month	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Zone 10	Zone 11	State ^a
April	0	0	1	1	1	3	1	1	1	6	5	3
May	10	25	25	38	29	24	44	36	35	33	27	30
June	31	52	73	85	88	95	111	92	108	123	114	105
July	116	117	147	164	166	177	214	164	200	214	222	199
August	83	83	105	121	125	126	155	120	163	154	180	151
September	10	11	23	20	16	36	28	27	35	48	63	44
October	0	0	1	0	0	2	1	1	1	4	5	3
Total	250	288	375	429	425	463	554	441	543	582	616	535

^a Population-weighted statewide average, based on 2000 census.

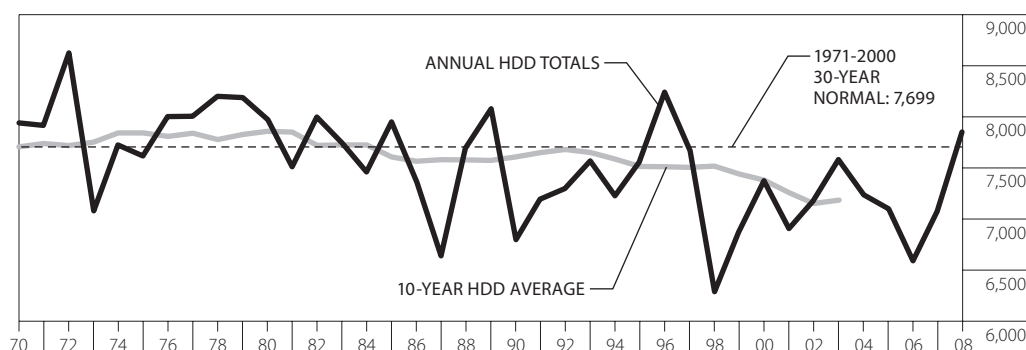
Source: National Oceanic and Atmospheric Administration, "Monthly Normals of Temperature, Precipitation, and Heating and Cooling Degree Days, 1971-2000 Wisconsin" *Climatology of the United States No. 81 (by State)*, (December 2000).

Wisconsin Population-Weighted Heating Degree Days

1970-2008

What significance does the number of HDDs have on energy use? Increased HDDs means that space heating is used more because the temperature is cooler. Fewer HDDs means that space heating is used less because the temperature is warmer. Fluctuations in HDDs can also influence such variables as price and volume of winter heating fuels (e.g., propane, heating oil, natural gas). See Winter Peak Demand due to electric space heating, page 62.

The 10-year average and 30-year normal^b are presented here as a point of reference for the variation in HDDs. The 10-year average is plotted in the middle of an 11-year period, averaging the five years previous to, and five years, after the plotted year. For example, the number plotted on the graph at 2003 is the average of 1998 through 2008. The 10-year average is not plotted for 2004 through 2008 because these averages cannot yet be calculated.



Month	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Normal	1,507	1,223	1,016	616	300	79	17	33	180	505	900	1,323	7,699
1970	1,715	1,292	1,116	565	295	81	15	15	179	430	888	1,343	7,934
1975	1,375	1,246	1,212	790	221	74	23	17	258	412	713	1,268	7,609
1980	1,465	1,378	1,141	582	240	117	8	14	177	634	867	1,345	7,968
1985	1,614	1,296	883	474	189	107	7	32	194	486	993	1,660	7,935
1990	1,141	1,119	880	532	361	52	19	19	131	497	708	1,321	6,780
1995	1,344	1,197	890	682	254	38	8	1	213	455	1,097	1,375	7,554
2000	1,428	1,057	759	626	245	86	26	15	189	384	909	1,636	7,360
2005	1,436	1,043	1,073	491	331	20	9	12	75	425	811	1,369	7,095
2006	1,044	1,203	949	441	265	46	3	7	190	599	761	1,068	6,576
2007	1,282	1,398	853	615	201	35	11	13	130	319	879	1,337	7,073
2008	1,451	1,378	1,111	579	350	42	7	11	107	478	861	1,477	7,850

^a Population-weighted heating degree days are derived by multiplying the number of heating degree days in each degree day zone by the population in that degree day zone, adding the products, then dividing by the total state population (based on 2000 census data).

^b The 30-year normal runs from 1971 to 2000 and is developed by the National Oceanographic and Atmospheric Agency (NOAA).

Source: Wisconsin Department Office of Energy Independence, degree day data based on daily data from the University of Wisconsin-Madison, Wisconsin State Climatology Office (<http://www.aos.wisc.edu/~sco/>)

2008 HDD
2.0%
MORE THAN
THE 30-YEAR
NORMAL

There were 2.0 percent more population-weighted^a heating degree days (HDD) in 2008 than the normal and 11.0 percent more than in 2007. The period 2000 to 2008, averaged 7,203 heating degree days; 6.4 percent fewer than the 30-year normal.

In 2008, the number of HDDs increased because the winter was colder. 2008 represents a slight departure from a trend since 1995 of warmer winters with fewer HDDs. The National Oceanographic and Atmospheric Agency (NOAA) and the Energy Information Administration (EIA) predicted that the winter of 2008-2009 would return to the trend of warmer winters with fewer HDDs. This prediction is based on a stronger than normal

El Niño.

2007 Wisconsin Heating Degree Days, by Zone and Month

Month	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Zone 10	Zone 11	State ^a
January	1,461	1,463	1,379	1,492	1,398	1,295	1,413	1,308	1,351	1,283	1,175	1,282
February	1,550	1,544	1,465	1,540	1,484	1,386	1,489	1,432	1,526	1,408	1,317	1,398
March	1,011	1,055	976	979	959	897	881	886	871	825	779	852
April	768	731	669	648	655	607	593	623	603	592	612	615
May	332	284	242	193	222	200	171	160	147	145	232	201
June	113	53	47	32	44	42	23	33	29	21	36	35
July	64	48	34	17	19	19	6	8	3	2	7	11
August	44	49	34	26	29	20	21	17	13	6	3	13
September	202	203	174	200	183	145	149	137	147	117	98	130
October	466	442	397	439	401	341	390	355	371	299	252	319
November	997	1,030	964	961	981	899	955	903	926	883	803	879
December	1,541	1,549	1,445	1,564	1,524	1,341	1,508	1,427	1,451	1,350	1,194	1,337
Total	8,549	8,451	7,826	8,091	7,899	7,192	7,599	7,289	7,438	6,931	6,508	7,073

^a Population-weighted statewide average, based on 2000 census.

Source: Wisconsin Department of Administration, Division of Energy Services, degree day data based on daily data from the University of Wisconsin-Madison, Department of Meteorology.

2008 Wisconsin Heating Degree Days, by Zone and Month

Month	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Zone 10	Zone 11	State ^a
January	1,589	1,570	1,533	1,648	1,607	1,481	1,621	1,494	1,585	1,468	1,313	1,451
February	1,503	1,548	1,488	1,541	1,554	1,415	1,518	1,445	1,494	1,392	1,240	1,378
March	1,297	1,343	1,257	1,243	1,283	1,155	1,200	1,182	1,155	1,089	1,000	1,111
April	787	758	667	716	679	559	641	589	568	514	554	579
May	504	441	396	380	373	337	345	351	293	317	359	350
June	166	91	66	75	53	31	28	48	19	16	49	42
July	45	14	9	9	4	3	4	4	2	2	11	7
August	78	44	31	26	25	10	18	12	17	8	2	11
September	212	186	167	185	162	140	137	115	122	97	58	107
October	614	613	571	558	554	513	530	529	545	487	396	478
November	1,010	1,018	969	976	932	904	950	906	857	844	780	861
December	1,685	1,680	1,618	1,702	1,649	1,542	1,648	1,584	1,531	1,480	1,311	1,477
Total	9,490	9,306	8,772	9,059	8,875	8,090	8,640	8,259	8,188	7,714	7,073	7,850

^a Population-weighted statewide average, based on 2000 census.

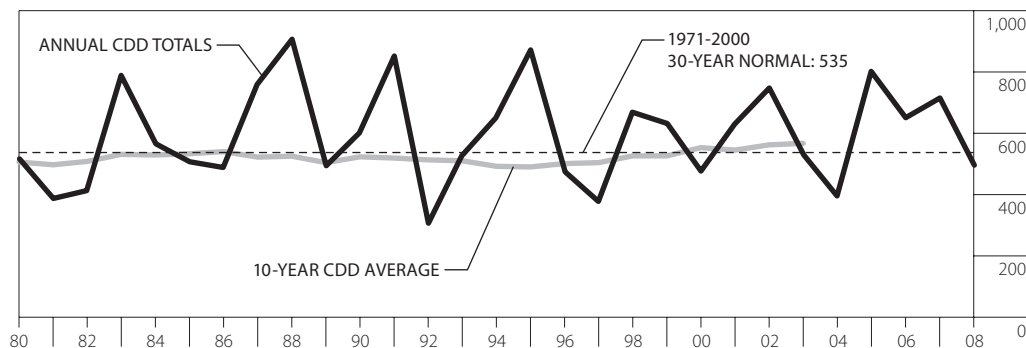
Source: Wisconsin Office of Energy Independence, degree day data based on daily data from the University of Wisconsin-Madison, State Climatology Office.

Wisconsin Population-Weighted Cooling Degree Days

1980-2008

What significance does the number of CDDs have on energy use? Increased CDDs means that air conditioning may be used more because the temperature is warmer. Fewer CDDs means that air conditioning may be used less because the temperature is cooler. Fluctuations in CDDs can also influence such variables as peak electric demand and the wholesale price of electricity. See Summer Peak Demand due to air conditioning, page 62.

The 10-year average and 30-year normal^c are presented here as a point of reference for the variation in CDDs. The 10-year average is plotted in the middle of an 11-year period, averaging the five years previous to, and five years after, the plotted year. For example, the number plotted on the graph at 2003 is the average of 1998 through 2008. The 10-year average is not plotted for 2004 through 2008 because these averages cannot yet be calculated.



Month	April ^b	May	June	July	August	September	October ^b	Total
Normal	3	30	105	199	151	44	3	535
1980	9	34	71	218	156	27	0	515
1985	31	28	60	185	98	103	0	505
1990	32	3	120	176	164	99	4	598
1995	0	8	223	273	310	47	5	866
2000	0	37	88	136	154	53	5	473
2005	3	4	211	228	200	119	32	797
2006	1	52	94	302	169	26	4	648
2007	8	48	132	201	196	90	37	712
2008	0	1	93	195	150	52	4	495

^a Population-weighted cooling degree days are derived by multiplying the number of cooling degree days in each degree day zone by the population in that degree day zone, adding the products, then dividing by the total state population (based on 2000 census data).

^b Includes March for the years 2001 and 2007. For 1990, the October column also includes November.

^c The 30-year normal runs from 1971 to 2000 and is developed by the National Oceanographic and Atmospheric Agency (NOAA).

Source: Wisconsin Office of Energy Independence, degree day data based on daily data from the University of Wisconsin-Madison, State Climatology Office.

SUMMER
2008 CDD
30.5%
FEWER THAN
2007

Using population-weighted^a cooling degree days (CDD) as an index, the summer of 2008 was cooler than the summer of 2007, with 30.5 percent fewer cooling degree days. In 2008, the number of cooling degree days was 7.5 percent below the 30-year normal.

In 2008, the number of CDDs decreased because the summer was cool. 2008 represents a slight departure from a trend since 2005 of hotter summers with more CDDs.

Wisconsin Cooling Degree Days, by Zone and Month

2005-2008

Month	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Zone 10	Zone 11	State ^a
2005												
April	0	0	0	8	0	1	4	4	3	2	4	3
May	0	2	3	3	1	3	4	4	4	7	4	4
June	83	145	174	162	168	203	188	208	204	239	229	211
July	128	204	195	257	202	187	257	235	231	239	242	228
August	66	125	136	165	135	147	170	163	156	195	269	200
September	47	67	72	98	65	77	92	100	93	131	162	119
October	1	16	24	10	23	31	30	30	26	34	39	32
Total	325	559	604	703	594	649	745	744	717	847	949	797
2006												
April	0	0	0	0	0	0	0	0	0	2	3	1
May	23	55	51	68	49	47	78	62	56	63	42	52
June	56	67	71	112	75	76	146	100	84	90	98	94
July	252	243	257	345	251	271	376	289	258	297	316	302
August	98	103	107	134	107	110	177	157	172	161	222	169
September	6	35	24	21	10	14	22	20	16	18	39	26
October	0	0	2	0	0	3	4	4	9	6	3	4
Total	435	503	512	680	492	521	803	632	595	637	723	648
2007												
March	0	0	1	0	0	2	4	2	4	5	7	4
April	0	0	2	2	0	3	7	8	4	5	3	4
May	28	24	35	28	39	46	54	60	41	62	46	48
June	65	83	104	143	114	124	152	161	131	139	132	132
July	163	146	157	205	152	168	225	200	169	222	219	201
August	114	117	138	150	141	160	170	176	176	219	235	195
September	39	62	71	57	63	80	80	77	69	91	113	90
October	4	18	26	17	33	33	35	38	29	38	45	37
Total	413	450	534	602	542	616	727	722	623	781	800	712
2008												
March	0	0	0	0	0	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0	0	0	0	0	0
May	0	0	0	0	0	0	0	5	7	2	0	1
June	25	39	77	41	40	104	52	79	99	111	109	93
July	92	110	156	173	138	188	186	169	179	220	214	195
August	70	66	107	119	90	138	129	113	89	144	195	150
September	38	29	33	39	32	33	47	47	36	57	69	52
October	0	0	2	3	5	3	4	5	1	4	6	4
Total	225	244	375	375	305	466	418	418	411	538	593	495

^a Population-weighted statewide average, based on 2000 census.

Source: Wisconsin Office of Energy Independence, degree day data based on daily data from the University of Wisconsin-Madison, State Climatology Office.

Wisconsin New Single and Two Family Building Permits

1990-2008^a

	1990		2000		2005		2007		2008	
Type										
Single Family	9,630	93.7%	17,548	93.5%	20,380	94.0%	12,964	95.5%	8,644	96.0%
Two Family	649	6.3%	1,219	6.5%	1,306	6.0%	616	4.5%	360	4.0%
Heating Equipment										
Forced Air	9,486	92.3%	16,972	95.6%	19,256	88.1%	11,763	76.2%	7,718	70.8%
Radiant Electric	118	1.1%	343	1.9%	515	2.4%	292	1.9%	254	2.3%
Heat Pump	12	0.1%	50	0.3%	199	0.9%	238	1.5%	275	2.5%
Boiler	75	0.7%	385	2.2%	1,017	4.7%	879	5.7%	653	6.0%
Not Specified	588	5.7%	10	0.1%	871	4.0%	2,263	14.7%	2,003	18.4%
AC Equipped										
Yes	2,415	23.5%	10,820	57.7%	14,208	65.5%	8,862	65.2%	5,733	63.7%
No	7,864	76.5%	7,947	42.3%	7,499	34.5%	4,736	34.8%	3,272	36.3%
Space Heating Source										
Natural Gas	8,312	80.9%	11,640	62.2%	13,061	60.2%	7,324	53.8%	4,986	55.4%
LP Gas	860	8.4%	3,733	19.9%	4,703	21.7%	3,328	24.4%	2,293	25.5%
Oil	60	0.6%	49	0.3%	33	0.2%	10	0.1%	6	0.1%
Electric	128	1.2%	175	0.9%	265	1.2%	225	1.7%	337	3.7%
Solid	12	0.1%	0	0.0%	83	0.4%	176	1.3%	150	1.7%
Solar	0	0.0%	0	0.0%	83	0.4%	20	0.1%	47	0.5%
Not Specified	907	8.8%	3,117	16.7%	3,477	16.0%	2,533	18.6%	1,186	13.2%
Water Heating Source										
Natural Gas	8,066	78.5%	11,690	62.3%	12,348	56.9%	7,091	52.1%	4,878	54.2%
LP Gas	720	7.0%	2,746	14.6%	3,484	16.1%	2,390	17.6%	1,997	22.2%
Oil	18	0.2%	12	0.1%	12	0.1%	2	0.0%	4	0.0%
Electric	480	4.7%	1,495	8.0%	2,058	9.5%	1,788	13.1%	814	9.0%
Solid	4	0.0%	27	0.1%	58	0.3%	39	0.3%	108	1.2%
Solar	0	0.0%	1	0.0%	36	0.2%	4	0.0%	46	0.5%
Not Specified	991	9.6%	2,796	14.9%	3,709	17.1%	2,287	16.8%	1,158	12.9%
Living Area (Sq. Ft)										
1-1,000	208	2.1%	654	3.7%	591	2.8%	576	4.5%	443	5.1%
1,001-1,800	4,292	43.6%	7,681	43.4%	7,764	37.2%	5,176	40.2%	3,501	40.6%
1,801-2,400	2,903	29.5%	4,874	27.5%	6,091	29.2%	3,289	25.5%	2,134	24.8%
2,401-Greater	2,451	24.9%	4,496	25.4%	6,444	30.8%	3,836	29.8%	2,535	29.4%
Average (Sq. Ft)	2,013		2,101		2,101		2,150		2,150	

SINGLE FAMILY
PERMITS
33%
FROM
2007 TO 2008

From 2007 to 2008,
there was a 33 percent
decrease in construction
for single family
building permits,

TWO-FAMILY
PERMITS
42%
FROM
2007 TO 2008

and a 42 percent
decrease for two-family
building permits.

Although there was
a 135 percent increase
for solar space heating,
and a 1,050 percent
increase in solar for
water heating, natural
gas and propane remain
the most commonly used
fuels for space and
water heating.

^a These statistics are incomplete before January 1, 2005, as not all municipalities who issue building permits reported this information.

Source: Wisconsin Department of Commerce, Division of Safety and Buildings <http://www.commerce.state.wi.us/SB/SB-StatsUDCStatisticsList.html>